AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (Currently Amended) A data transmission method that puts variable length transmitted data into frames of a fixed time length and transmits these frames, comprising the steps of:

at a transmitting side,

calculating an error-detecting code of the transmitted data, frame by frame;

generating frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data ~~and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other~~; and

transmitting the generated frame data, and

at a receiving side,

receiving the frame data;

assuming the transmitted data and the error-detecting code by assuming a final bit position of the frame data, frame by frame, for the received frame data and calculating the error-detecting code of the assumed transmitted data;

deciding that among the assumed final bit positions of the frame data, a position where the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data; and

acquiring the transmitted data on the basis of [[said]] a decision result,

wherein

at the transmitting side,

if the number of bits of the transmitted data is zero, said step of calculating the error-detecting code considers a previously-specified bit pattern to be the error-detecting code, and

at the receiving side,

said step of calculating the error-detecting code also assumes a position where the number of bits of the transmitted data becomes zero as the final bit position of the frame data, and

if the error-detecting code when the position where the number of bits of the transmitted data becomes zero is assumed as the final bit position of the frame data agrees with said previously-specified bit pattern, said step of deciding decides that the position where the number of bits of the transmitted data becomes zero is the final bit position of the frame data.

Claim 2-4. (Cancelled).

Claim 5. (Currently Amended) The data transmission method as claimed in any one of claims 1, 81 and 82 [[1-4]], further comprising the steps of:

at the transmitting side,

conducting error-correcting coding of the generated frame data; and

conducting interleaving of the frame data that has undergone the error-correcting coding, and

at the receiving side,

conducting deinterleaving of the received frame data; and

conducting error-correcting decoding of the frame data that has undergone the deinterleaving.

Claim 6. (Currently Amended) The data transmission method as claimed in claim 5, wherein

at the transmitting side,

said step of generating the frame data generates the frame data containing a tail bit; and

said step of conducting the error-correcting coding conducts the error-correcting coding with a convolutional code, and

at the receiving side,

said step of conducting the error-correcting decoding assumes the final bit position of the frame data, frame by frame, for the frame data that has undergone the deinterleaving, conducts the error-correcting decoding thereof by **[[**the**]]** a maximum likelihood decoding method up to said assumed final bit position, and at said assumed final bit position, calculates a likelihood difference between the maximum of likelihoods of a plurality of decoded data sequences that are candidates with respect to the

transmitted data sequence and a likelihood of the decoded data sequence obtained by terminating the decoding with respect to the transmitted data sequence, and

said step of deciding decides that among the assumed final bit positions of the frame data, a position where the obtained likelihood difference is within a predetermined range and the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data.

Claim 7. (Original) The data transmission method as claimed in claim 6, wherein at the receiving side, the predetermined range regarding the likelihood difference at said step of deciding depends on the assumed final bit position of the frame data.

Claims 8 and 9. (Cancelled).

Claim 10. (Previously Presented) The data transmission method as claimed in claim 6, further comprising the step of:

at the transmitting side,

calculating transmission rate information indicating the number of bits of the transmitted data, frame by frame,

wherein said step of generating the frame data generates the frame data containing the calculated transmission rate information, and

at the receiving side,

wherein both said step of conducting the error-correcting decoding and said step of calculating the error-detecting code assume the final bit position of the frame data on the basis of the transmission rate information in the received frame data.

Claim 11. (Original) The data transmission method as claimed in claim 10, wherein at the transmitting side, said step of conducting the error-correcting coding conducts, for the transmission rate information, independent error-correcting coding that is separate from the error-correcting coding for the transmitted data, the error-detecting code, and the tail bit.

Claim 12. (Original) The data transmission method as claimed in claim 11, wherein at the transmitting side, said step of conducting the error-correcting coding conducts the error-correcting coding of the transmission rate information by using a block code.

Claim 13. (Original) The data transmission method as claimed in claim 10, wherein at the transmitting side, said step of conducting the error-correcting coding conducts the error-correcting coding of all of the transmission rate information, the transmitted data, the error-detecting code, and the tail bit collectively with a convolutional code.

Claim 14. (Previously Presented) The data transmission method as claimed in claims 10, wherein at the receiving side, if said step of deciding does not decide that the final bit position of the frame data assumed on the basis of the transmission rate information in the received frame data is the final bit position of the frame data, both said step of conducting the

error-correcting decoding and said step of calculating the error-detecting code assume a position other than the final bit position of the frame data assumed on the basis of the transmission rate information in the received frame data as the final bit position of the frame data.

Claims 15-24. (Cancelled).

Claim 25. (Currently Amended) The data transmission method as claimed in any one of claims 1, [[3, 4, 8, 9, 19 or 20]] 81 and 82, wherein said error-detecting code is a CRC code.

Claim 26. (Currently Amended) A data transmission system that puts variable length transmitted data into frames of a fixed time length and transmits these frames, comprising:

in a transmitter,

means for calculating an error-detecting code of the transmitted data, frame by frame;

means for generating frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data ~~and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other~~; and

means for transmitting the generated frame data, and

in a receiver,

means for receiving the frame data;

means for assuming the transmitted data and the error-detecting code by assuming a final bit position of the frame data, frame by frame, for the received frame data, and calculating the error-detecting code of the assumed transmitted data;

means for deciding that among the assumed final bit positions of the frame data, a position where the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data; and

means for acquiring the transmitted data on the basis of a **[[said]]** decision result, wherein

in the transmitter,

if the number of bits of the transmitted data is zero, said means for calculating the error-detecting code considers a previously-specified bit pattern to be the error-detecting code, and

in the receiver,

said means for calculating the error-detecting code also assumes a position where the number of bits of the transmitted data becomes zero as the final bit position of the frame data, and

if the error-detecting code when the position where the number of bits of the transmitted data becomes zero is assumed as the final bit position of the frame data agrees with said previously-specified bit pattern, said means for deciding decides that the position where the number of bits of the transmitted data becomes zero is the final bit position of the frame data.

Claims 27-29. (Cancelled).

Claim 30. (Currently Amended) The data transmission system as claimed in any one of claims 26, 83 and 84 [[-29]], further comprising:

in the transmitter,

means for conducting error-correcting coding of the generated frame data; and

means for conducting interleaving of the frame data that has undergone the error-correcting coding, and

in the receiver,

means for conducting deinterleaving of the received frame data; and

means for conducting error-correcting decoding of the frame data that has undergone the deinterleaving.

Claim 31. (Currently Amended) The data transmission system as claimed in claim 30, wherein

in the transmitter,

said means for generating the frame data generates the frame data containing a tail bit, and

said means for conducting the error-correcting coding conducts the error-correcting coding with a convolutional code, and

in the receiver,

said means for conducting the error-correcting decoding assumes the final bit position of the frame data, frame by frame, for the frame data that has undergone the

deinterleaving, conducts the error-correcting decoding thereof by a [[the]] maximum likelihood decoding method up to said assumed final bit position, and at said assumed final bit position, calculates a likelihood difference between the maximum of likelihoods of a plurality of decoded data sequences that are candidates with respect to the transmitted data sequence and a likelihood of the decoded data sequence obtained by terminating the decoding with respect to the transmitted data sequence; and

said means for deciding decides that among the assumed final bit positions of the frame data, a position where the obtained likelihood difference is within a predetermined range and the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data.

Claim 32. (Original) The data transmission system as claimed in claim 31, wherein in the receiver, the predetermined range regarding the likelihood difference at said means for deciding depends on the assumed final bit position of the frame data.

Claims 33 and 34. (Cancelled).

Claim 35. (Previously Presented) The data transmission system as claimed in claim 31, further comprising:

in the transmitter,

means for calculating transmission rate information indicating the number of bits of the transmitted data, frame by frame,

wherein said means for generating the frame data generates the frame data containing the calculated transmission rate information, and

in the receiver,

wherein both said means for conducting the error-correcting decoding and said means for calculating the error-detecting code assume the final bit position of the frame data on the basis of the transmission rate information in the received frame data.

Claim 36. (Original) The data transmission system as claimed in claim 35, wherein in the transmitter, said means for conducting the error-correcting coding conducts, for the transmission rate information, independent error-correcting coding that is separate from the error-correcting coding for the transmitted data, the error-detecting code, and the tail bit.

Claim 37. (Original) The data transmission system as claimed in claim 36, wherein in the transmitter, said means for conducting the error-correcting coding conducts the error-correcting coding of the transmission rate information by using a block code.

Claim 38. (Original) The data transmission system as claimed in claim 35, wherein in the transmitter, said means for conducting the error-correcting coding conducts the error-correcting coding of all of the transmission rate information, the transmitted data, the error-detecting code, and the tail bit collectively with a convolutional code.

Claim 39. (Previously Presented) The data transmission system as claimed in claim 35, wherein in the receiver, if said means for deciding does not decide that the final bit

position of the frame data assumed on the basis of the transmission rate information in the received frame data is the final bit position of the frame data, both said means for conducting the error-correcting decoding and said means for calculating the error-detecting code assume a position other than the final bit position of the frame data assumed on the basis of the transmission rate information in the received frame data as the final bit position of the frame data.

Claims 40-49. (Cancelled).

Claim 50. (Currently Amended) The data transmission system as claimed in any one of claims 26, 83 and 84 ~~28, 33, 34, 44 or 45~~, wherein said error-detecting code is a CRC code.

Claim 51. (Currently Amended) A transmitter that puts variable length transmitted data into frames of a fixed time length and transmits these frames, comprising:

means for calculating an error-detecting code of the transmitted data, frame by frame;

means for generating frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data ~~and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other~~; and

means for transmitting the generated frame data,

wherein if the number of bits of the transmitted data are zero, said means for calculating the error-detecting code considers a previously-specified bit pattern to be the error-detecting code.

Claims 52 and 53. (Cancelled).

Claim 54. (Currently Amended) A receiver for receiving frame data containing variable length transmitted data, and an error-detecting code calculated, frame by frame, for said transmitted data in each frame of a fixed time length such that the error-detecting code is arranged after the corresponding transmitted data, and if the number of bits in the transmitted data is zero, a previously specified bit pattern is considered to be ~~and bit arrangements of the transmitted data and of~~ the error-detecting code ~~are set in a reverse order to each other~~, comprising:

means for receiving the frame data;

means for assuming the transmitted data and the error-detecting code by assuming a final bit position of the frame data, frame by frame, for the received frame data, and calculating the error-detecting code of the assumed transmitted data;

means for deciding that among the assumed final bit positions of the frame data, a position where the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data; and

means for acquiring the transmitted data on the basis of a [[said]] decision result,

wherein said means for calculating the error-detecting code also assumes a position where the number of bits of the transmitted data becomes zero as the final bit position of the frame data, and

if the error-detecting code when the position where the number of bits of the transmitted data becomes zero is assumed as the final bit position of the frame data agrees with said

previously-specified bit pattern, said means for deciding decides that the position where the number of bits of the transmitted data becomes zero is the final bit position of the frame data.

Claims 55-80. (Cancelled).

Claim 81. (New) The data transmission method as claimed in claim 1, wherein at the transmitting side, said step of generating the frame data generates the frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other.

Claim 82. (New) The data transmission method as claimed in claim 1, wherein at the transmitting side, said step of generating the frame data generates the frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in the same order.

Claim 83. (New) The data transmission system as claimed in claim 26, wherein in the transmitter, said means for generating the frame data generates the frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other.

Claim 84. (New) The data transmission system as claimed in claim 26, wherein in the transmitter, said means for generating the frame data generates the frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after" the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in the same order.

Claim 85. (New) The transmitter as claimed in claim 51, wherein said means for generating the frame data generates the frame data containing the transmitted data and the calculated error detecting code such that the error-detecting code is arranged after the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in a reverse order to each other.

Claim 86. (New) The transmitter as claimed in claim 51, wherein said means for generating the frame data generates the frame data containing the transmitted data and the calculated error-detecting code such that the error-detecting code is arranged after the corresponding transmitted data and bit arrangements of the transmitted data and of the error-detecting code are set in the same order.

Claim 87. (New) The transmitter as claimed in any one of claims 51, 85 and 86, further comprising:

means for conducting error-correcting coding of the generated frame data; and

means for conducting interleaving of the frame data that has undergone the error-correcting coding.

Claim 88. (New) The transmitter as claimed in claim 87, wherein

said means for generating the frame data generates the frame data containing a tail bit, and

said means for conducting the error-correcting coding conducts the error-correcting coding with a convolutional code.

Claim 89. (New) The transmitter as claimed in any one of Claims 51, 85 and 86, further comprising:

means for calculating transmission rate information indicating the number of bits of the transmitted data, frame by frame,

wherein said means for generating the frame data generates the frame data containing the calculated transmission rate information.

Claim 90. (New) The transmitter as claimed in claim 89, wherein said means for conducting the error-correcting coding conducts, for the transmission rate information, independent error-correcting coding that is separate from the error-correcting coding for the transmitted data, the error-detecting code, and the tail bit.

Claim 91. (New) The transmitter as claimed in claim 90, wherein said means for conducting the error-correcting coding conducts the error-correcting coding of the transmission rate information by using a block code.

Claim 92. (New) The transmitter as claimed in claim 89, wherein said means for conducting the error-correcting coding conducts the error-correcting coding of all of the transmission rate information, the transmitted data, the error-detecting code, and the tail bit collectively with a convolutional code.

Claim 93. (New) The transmitter as claimed in any one of claims 51, 85 and 86, wherein said error-detecting code is a CRC code.

Claim 94. (New) The receiver as claimed in claim 54, further comprising:

means for conducting deinterleaving of the received frame data; and

means for conducting error-correcting decoding of the frame data that has undergone the deinterleaving.

Claim 95. (New) The receiver as claimed in claim 94, wherein

said means for conducting the error-correcting decoding assumes the final bit position of the frame data, frame by frame, for the frame data that has undergone the deinterleaving, conducts the error-correcting decoding thereof by a maximum likelihood decoding method up to said assumed final bit position, and at said assumed final bit position, calculates a likelihood difference between the maximum of likelihoods of a plurality of decoded data sequences that are candidates with respect to the transmitted data sequence and a likelihood of the decoded data sequence obtained by terminating the decoding with respect to the transmitted data sequence; and

said means for deciding decides that among the assumed final bit positions of the frame data, a position where the obtained likelihood difference is within a predetermined range and the assumed error-detecting code agrees with the error-detecting code calculated on the basis of the assumed transmitted data is the final bit position of the frame data.

Claim 96. (New) The receiver as claimed in claim 95, wherein the predetermined range regarding the likelihood difference at said means for deciding depends on the assumed final bit position of the frame data.

Claim 97. (New) The receiver as claimed in any one of claims 95 or 96, wherein both said means for conducting the error-correcting decoding and said means for calculating the error-detecting code assume the final bit position of the frame data on the basis of transmission rate information in the received frame data.

Claim 98. (New) The receiver as claimed in claim 97, wherein if said means for deciding does not decide that the final bit position of the frame data assumed on the basis of the transmission rate information in the received frame data is the final bit position of the frame data, both said means for conducting the error-correcting decoding and said means for calculating the error-detecting code assume a position other than the final bit position of the frame data assumed on the basis of the transmission rate information in the received frame data as the final bit position of the frame data.

Claim 99. (New) The receiver as claimed in any one of claims 54, 94 and 95, wherein said error-detecting code is a CRC code.